

CLAIMS

1. Grinding balls made of fritted ceramic comprising a compound of alumina silicate ($\alpha\text{Al}_2\text{O}_3.\beta\text{SiO}_2$), zirconia ($\text{ZrO}_2 + \text{HfO}_2$) and alumina (Al_2O_3).

5 2. Grinding balls made of fritted ceramic as in Claim 1, wherein said ceramic moreover comprises 1 to 5% by weight of oxides selected from the group of Na_2O , MgO , CaO and BaO .

10 3. Grinding balls made of fritted ceramic as in Claim 1, wherein said compound of alumina silicate comprises mulitite ($3\text{Al}_2\text{O}_3.2\text{SiO}_2$).

4. Grinding balls made of fritted ceramic as in Claim 1, wherein said ceramic moreover comprises a stabilizing agent selected from the rare earth oxides.

15 5. Grinding balls made of fritted ceramic, produced from a mixture comprising the following ingredients (in % by weight):

- 5 to 40% $\text{ZrO}_2 + \text{HfO}_2$,

- 0.1 to 10% Y_2O_3 ,

20 - 0.5 to 20% SiO_2 ,

- 40 to 90% Al_2O_3 , with a $\text{ZrO}_2/\text{SiO}_2$ ratio greater than or equal to 2.

6. Grinding balls made of fritted ceramic, produced from a mixture comprising the following ingredients (in % by weight):

- 10 to 24% $\text{ZrO}_2 + \text{HfO}_2$,

- 0.5 to 3% Y_2O_3 ,

- 5 to 12% SiO_2 ,

- 60 to 85% Al_2O_3

30 with a $\text{ZrO}_2/\text{SiO}_2$ ratio greater than or equal to 2.

7. Grinding balls made of fritted ceramic, obtained by a method for fritting a mixture comprising the following ingredients (in % by weight):

- 10 to 24% $\text{ZrO}_2 + \text{HfO}_2$,

- 0.5 to 3% Y_2O_3 ,
- 5 to 12% SiO_2 ,
- 60 to 85% Al_2O_3

with a $\text{ZrO}_2/\text{SiO}_2$ ratio equal to 2.

5 **8.** Grinding balls made of fritted ceramic, wherein said balls have a diameter between 0.1 and 100mm.

9. Grinding balls made of fritted ceramic, wherein said balls have a diameter between 0.5 and 50 mm.

10 **10.** Grinding balls made of fritted ceramic, wherein said balls have a diameter between 0.5 and 10 mm.

11. Method for manufacturing grinding balls made of fritted ceramic, comprising the following steps:

- mixing and/or grinding raw materials by dry and/or wet processes so as to form a slurry with the possible addition of binding agents and/or organic surfactants;
- passing said slurry through a granulation means or process;
- selecting by sieving the balls obtained with the return back to the mixer of the balls having unsatisfactory grain size via a possible drying and/or grinding step;
- 20 - drying the balls of satisfactory grain size;
- fritting the balls of statisfactory grain size between 1400°C and 1600°C followed by a packaging step.

12. Method for manufacturing grinding balls made of fritted ceramic as in Claim 11, wherein the granulation means comprise fluidised-bed granulators and granulation discs.

13. Method for manufacturing grinding balls made of fritted ceramic as in Claim 11, wherein the granulation methods comprise gelation methods or injection moulding methods.

14. Method for manufacturing grinding balls made of fritted ceramic as in Claim 11, wherein said organic binding agents are chosen from the group of polysaccharides,

thermoplastic polymers, thermosetting polymers or polymers based on aqueous or organic solvents.

15. Method for manufacturing grinding balls made of fritted ceramics as in Claim 11, wherein said surfactants 5 are chosen from the group of carboxylic acids such as stearic acid or oleic acid and/or polyelectrolytes such as ammonium polymethylacrylate.

16. Use of the grinding balls made of fritted ceramic as in Claim 1 for grinding mineral or organic 10 materials.